

Amendments to the Claims/Listing of Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

1-11. Canceled

12. (Currently amended) A device for identifying a first analyte of a group of analytes in a biological sample, including using a substrate having a plurality of targets thereon, the plurality of targets being configured to bind the first analyte, the device comprising:

~~a substrate including a first plurality of regions having a binding receptor thereon, the binding receptor being configured to bind the first analyte, and a second region without the binding receptor thereon, the second region separating individual regions of the first plurality of regions;~~

~~an optical source configured to generate~~ that generates a source beam;

~~a beam splitter that splits the source beam into a probe beam and a reference beam, the probe beam illuminating a beam spot on the substrate;~~

~~a signal path along which the probe beam travels;~~

~~a reference path along which the reference beam travels, the reference path being at least partially different from the signal path;~~

~~a scanner on the signal path configured to generate~~ that generates relative motion between the probe beam and the substrate such that the beam spot-probe beam illuminates the plurality of targets on the substrate portions of the first plurality of regions and the second region in a sequential manner and interacts with the substrate to form a return beam, the return beam including a signal beam which travels along the signal path generated by the interaction of the

~~probe beam with a portion of the first plurality of regions and a reference beam generated by the interaction of the probe beam with a portion of the second region;~~

~~an interferometer including an adaptive optical element on both the signal path and the reference path that, the adaptive optical element positioned and configured to combine the reference beam and the signal beam to form an output beam combines a first portion of the signal beam and a first portion of the reference beam to form a first output beam which travels along the signal path and combines a second portion of the signal beam and a second portion of the reference beam to form a second output beam which travels along the reference path; and~~

~~a reference path detector on the reference path responsive to the second output beam to generate a reference path signal; and~~

~~a processing system that determines configured to detect the presence or absence of the first analyte based upon the output beam reference path signal.~~

13-16. Canceled

17. (Currently amended) The device of claim ~~16~~ 12, wherein the scanner ~~comprises a motor configured to spin~~ spins the substrate such that the probe beam is sequentially incident on the plurality of targets on the substrate ~~first plurality of spaced apart regions of a first track, and a controller, including a tracking device and a radial control, the tracking device causing the probe beam to follow a single track of the plurality of concentric tracks and the radial control causing the probe beam to move from one track of the plurality of concentric tracks to another track of the plurality of concentric tracks.~~

18. (Currently amended) The device of claim 12, wherein the ~~interferometer operates in a quadrature condition~~ source wavelength is tuned to cause the signal beam and the reference beam to be in quadrature after passing through the adaptive optical element.

19-44. Canceled

45. (Currently amended) The device of claim 12, further comprising:
a motor ~~configured to spin that spins~~ the substrate;
wherein the probe beam ~~generated by the optical source illuminates the first plurality of regions and the second region plurality of targets in a sequential manner and interacts with the substrate to form the signal beam and the reference beam as the substrate spins; and~~
the reference detector indicates the presence of the first analyte based on an interference characteristic of the second output beam, ~~the output beam having which has~~ a first interference characteristic if the first analyte is bound to the substrate and a second interference characteristic if the first analyte is not bound to the substrate.

46-58. Canceled

59. (New) The device of claim 12, further comprising .
a signal path detector on the signal path responsive to the first output beam to generate a signal path signal; and
wherein the processing system determines the presence or absence of the first analyte based upon both the signal path signal and the reference path signal.

60. (New) The device of claim 59, wherein the processing system computes a difference signal by subtracting one of the signal path signal and the reference path signal from the other of the signal path signal and the reference path signal, and determines the presence or absence of the first analyte based upon the difference signal.

61. (New) A device for identifying an analyte in a biological sample using a substrate having a plurality of targets thereon, the plurality of targets being configured to bind the analyte, the device comprising:

- an optical source that generates a source beam;

- a beam splitter that splits the source beam into a probe beam and a reference beam;

- a signal path along which the probe beam travels;

- a reference path along which the reference beam travels, the reference path being at least partially different from the signal path;

- a scanner on the signal path that generates relative motion between the probe beam and the substrate such that the probe beam illuminates the plurality of targets on the substrate in a sequential manner to form a signal beam that travels along the signal path;

- an adaptive optical element on both the signal path and the reference path that combines a first portion of the signal beam and a first portion of the reference beam to form a first output beam which travels along the signal path, and combines a second portion of the signal beam and a second portion of the reference beam to form a second output beam which travels along the reference path;

- a signal path detector on the signal path responsive to the first output beam to generate a

signal path signal;

a reference path detector on the reference path responsive to the second output beam to generate a reference path signal; and

a processing system that receives the signal path signal and the reference path signal and determines the presence or absence of the analyte based upon the signal path signal and the reference path signal.

62. (New) The device of claim 61, wherein the processing system computes a difference signal by subtracting one of the signal path signal and the reference path signal from the other of the signal path signal and the reference path signal, and determines the presence or absence of the analyte based upon the difference signal.

63. (New) The device of claim 61, wherein the source wavelength is tuned to cause the signal beam and the reference beam to be in quadrature.

64. (New) The device of claim 61, further comprising a motor that spins the substrate.

65. (New) The device of claim 61 wherein the signal detector and the reference detector indicate the presence of the analyte based on interference characteristics of the first and second output beams, the interference characteristics of the first and second output beams being different if the analyte is or is not bound to plurality of targets on the substrate.

66. (New) The device of claim 61, further comprising an electro-optical modulator on the reference path that imparts a phase shift to the reference beam..

67. (New) The device of claim 61, further comprising a polarizer on both the signal path and the reference path that polarizes the first output beam before it reaches the signal detector and polarizes the second output beam before it reaches the reference detector.